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Summary Review of Monthly Reports\*  
for  
SOIL CONSERVATION SERVICE RESEARCH\*

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EROSION CONTROL PRACTICES DIVISION

Corn on Kudzu Land - T. L. Copley of Raleigh, North Carolina.-

"Approximately one acre of corn was planted following a four year old stand of kudzu. The land was first disked and then turned preceding the removal of approximately 8,000 crowns. After a second disking the corn was planted and has since received two cultivations. The growth of the corn is excellent and the kudzu from the surviving crowns has practically covered the ground surface in the corn middles. This is proving to be an excellent demonstration and is creating considerable interest with the visitors to the Station."

Terrace Interval Observation - John T. Bregger of Clemson, South Carolina.- "A very interesting observation was made during June on the matter of terrace intervals. Following a high intensity rain of about 1-1/2 inches, observations were made on two nearby fields: (1) in cotton only, with terraces at standard interval; and (2) in 1-year peach trees with cotton intercrop with terraces at 15 to 30 feet intervals. In neither case were the terraces broken, but whereas sheet erosion was very light in the orchard field, it was very damaging in the cotton field. It appears that at periods when terraces alone must do the job of controlling erosion, a closer than standard interval provides a greater margin of safety which is often necessary."

Grazing Practices - O. K. Barnes of Laramie, Wyoming.- "The western wheat grass pasture is being stocked lighter this year and for a longer period than has been the practice in the past. As an early spring pasture western wheat has not equaled crested wheat in grazing capacity. However, its regrowth and palatability during the hot weather seems to be better than crested wheat. For this reason, it was decided to try grazing it this year at the rate of about 1 ewe and lamb per acre from April into August."

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\*\*All Research work of the Soil Conservation Service is in cooperation with the various State Experiment Stations.

Soil Loss Analysis - B. H. Hendrickson of Watkinsville, Georgia.-

"The five-year plot soil loss record was reviewed by John R. Carreker to determine the division in soil loss between suspension and sediment for the larger rains from continuous cotton on 3-, 7-, and 11-per cent slope plots.

"Proportions of average annual soil losses in the form  
of suspension and sediment 1/

Soil	Pct. slope	Slope length	Suspension		Sediment		Total
		Feet	T/A	Pct.	T/A	Pct.	T/A
Cecil sandy loam	3	105	3.00	63.5	1.72	36.5	4.72
Cecil sandy clay	7	70	4.93	17.1	23.89	82.1	28.82
Cecil clay.....	11	35	1.96	7.8	22.94	92.2	24.90

1/ 'Suspended soil' - derived from second tank ratio of eroded soil to second tank runoff water, applied to total runoff. 'Sediment' - the difference between suspended soil and total soil loss."

Percolation in Beltsville Silt Loam Soil - C. S. Slater of College Park, Maryland.-"Investigations show that in the Beltsville silt loam soil the 'bottleneck' in downward percolation is the upper part of a hardpan layer at about 20 to 26 inches. Microscopic examination of the hardpan shows that it is perforated with small capillaries sufficiently large to carry water that have the appearance of solution channels. A long wet spell has produced a temporary water table above the hardpan layer.

"Transmission of water through the hardpan has taken place on the basis of field measurements at a rate of about 0.05 inch per hour. In spite of the water table and the concurrent percolation, the body of the hardpan has every appearance of being dry, i.e., below field capacity.

"It is inferred that the tight layer at the upper surface of the hard pan may be formed in part by the deposition of suspended material in the percolating water due to stilling at the water table, that retardation of the water allows it to dissolve sufficient material to result slowly in the formation of solution channels in the body of the hardpan. The compaction of the body prevents the absorption of water throughout its mass.

Further testing is in progress; the evidence to date indicates that under proper conditions percolating water can be transmitted to ground water levels without fully satisfying the water retaining capacities of the horizons through which it passes."

Wireworm Infestation - Maurice Donnelly of Riverside, California.-

"Wireworm infestation, both on the lowlands and the hills, is severer this year than it has been for years. Because of the protection that a winter cover crop of any kind may give (if it is left long enough) to the bugs when they lay their eggs that hatch into wireworms, we cannot recommend use



of winter cover crop until such time as we can perfect a machine that will control winter cover crop effectively and with certainty at the right time. When we first began work on the lima-bean erosion problem, it appeared that the chief objections to a winter cover crop were that it interfered with cultivation and that it might adversely affect the moisture supply for the bean crop. The recent findings on the relation of winter cover crop to wireworm damage make it appear that this biotic factor is the most critical one."

Easier Weed Control with Turn Plowing - John Lamb, Jr. of Ithaca, New York.-"At Marcellus this spring a mixed alfalfa, timothy sod, rather weedy, was used for the comparison of disking, subsurface plowing, and regular turn plowing. A rolling coulter was used on the corn planted in front of the regular shoes and little difficulty was experienced in planting through the trash on the surface of the disked and subsurface plowed plots. There appears to be little if any difference in stand between these plots and those prepared by turn plowing. Roots and trash interfered more with cultivating than planting. There is no doubt but what the disked and subsurface plowed plots are going to be weedier than those prepared by turn plowing. Despite the use of Semasan, Jr. on seed corn there was considerable loss of stand on all plots from maggots during the cool, wet weather."

Hundt Farm Strip Crop Experiment - Orville E. Hays of LaCrosse, Wisconsin.-"Data from the Hundt farm strip crop experiment for the rains of May 20, 21, and 22 and from the rains of June 1 and 2 show interesting trends. This year the overburden (i.e., the four top strips) consists of corn, first year hay, second year hay and spring grain from top to bottom of the slope. High losses for these overburden strips can be attributed largely to the spring grain strip at the bottom. The runoff and soil loss from the spring grain strips below the overburden was directly proportional to the width of the strip. The amount of increase in soil loss for the rains of May 20, 21, 22 and June 1 and 2 was approximately 120 per cent for a 50-foot strip, 133 per cent for a 75-foot strip and 307 per cent for a 100-foot strip. The soil loss from contour planted check plot which was 250 feet long and not strip cropped was 238 per cent greater than the loss from the same length of slope strip cropped. Runoff losses were 31 per cent, 34 per cent, 62 per cent and 95 per cent, respectively, for a 50-foot, 75-foot, 100-foot width of strip and for the 250-foot check plot. Runoff and soil losses for corn and hay strips were inversely proportional to the width of strip.

Soil Moisture and Ground Cover Conditions - Ralph A. Cline of Bozeman, Montana.-"Field observations were made by L. F. Gieseke, Associate Agronomist, Montana Experiment Station, William A. Buchanan, Assistant Soil Scientist, and Ralph A. Cline, Research Project Supervisor. The same group also prepared the report after joint examination and consideration of the data collected.

"All sampling was done with a 4-foot soil auger; therefore, data for a depth beyond 48 inches are not available. Determinations of moisture contents of the soil were on the basis of feel and appearance. At least three borings were made in each area sampled. In most cases fields sampled were within the vicinity of local rain gauges so that interpretations of moisture conditions can be made with the added benefit of local precipitation records.

"The winter was mild and exceptionally dry. Most of the precipitation from which any increase in moisture was received since the October Survey was received the latter part of March and the first part of April. Prior to this time the ground was frozen and no moisture penetrated.

Fields of Land Use Capabilities II, III, and VI where found were sampled in both the Froid and Culbertson-Bainville Districts. The major soil types represented were Lihen sandy loam and fine sandy loam; Williams loam and fine sandy loam, Scobey silt loam, Straw silt loam, and Reserve loam.

"Fourteen wheat stubble fields, 13 corn fields, 2 cane fields, 8 native grass pastures and 5 crested wheatgrass pastures were sampled.

"The average moisture penetration in wheat stubble land was 22.3 inches with a range of 14 to 36 inches. The stubble was exceptionally heavy on the first year crop following summer fallow and adequate on the remaining fields sampled.

"The average moisture penetration in corn ground was 22.9 inches. With the exception of three fields all were within a range of 20 to 26 inches. Of the fields sampled, nine had ample stover residue for protective cover. The remaining three fields had stubble six to eight inches high which was considered as insufficient cover.

"The average moisture penetration in cane ground was 17 inches on the two fields sampled. Because of poor distribution sufficient fields were not found in the area for accurate comparisons. The amount of residue present on these fields was scant and will not afford much protective cover when seeded.

"The average moisture penetration in native grass pasture land was 17.5 inches. In the October survey these fields had an average moisture penetration of 4.8 inches. The forage cover was abundant on one field, average on three fields and scant on three fields. In all cases the moisture supply was considered to be good.

"The average moisture penetration in crested wheatgrass fields was 18.6 inches. In the October survey these fields had an average moisture penetration of 4.7 inches. The forage cover was abundant on three fields, average on one field and scant on one field. In all cases the moisture supply was considered to be good.

"Summer fallow that had less than 48 inches penetration of moisture in October, 1944 were rechecked. Of the fields sampled one had approximately the same penetration as last fall and on two fields the moisture had penetrated to a depth of 48 inches.

"Conditions are excellent for germinating and producing a stand of spring grain on summer fallow and favorable for flax on wheat stubble and corn ground.

"It was concluded that moisture penetration at the time of sampling was not correlated with Land Use Capability Classes and only slightly with crop residue and slope."



Economic Christmas Tree Production - J. C. Moore of Auburn, Alabama.-"Economic Christmas tree production has developed in our study at Auburn, Alabama. Arizona cypresses were cut for Christmas trees at different heights from the ground varying from 1 to 5 feet in December 1944. Six months later in June 1945 practically all trees cut have grown into more beautiful form than they were originally and are ready to be cut again in 1945 for Christmas trees.

"The lateral branches below the cut turned up without any pruning or training and have made excellent growth. This phase of Christmas tree production is commercially important from several points of view. (1) The soil is protected by a continuous soil-protecting cover. (2) Poor shaped trees can be cut back early thus causing them to grow into more desirable Christmas trees. (3) Cash returns per acre will be greatly increased by continuous cutting."

Relation of Temperature in the Spring of 1945 to Development and Frost Injury of Grapes and Plums - J. M. Aikman of Ames, Iowa.-"Frost injury was very severe this spring at the Floris Station because of the prevailingly high temperature the last half of March and early April and the frequent severe frost periods during April and May. In frost injury studies, readings with calibrated test thermometers, exposed for only 10 minutes near buds or new growth at or just before daybreak, agreed much more closely with readings of unsheltered minimum thermometers than with those of sheltered thermographs. None of the minimum temperature readings varied more than one degree from the minimum temperature to which the buds or new growth were exposed but minimum readings from sheltered thermographs were two to four degrees higher than the minimum temperature to which the buds were exposed.

"Subsequent examination of the vines indicate that there was more severe injury to the vines at the middle elevation than at the other two locations on the slope. At the lowest elevation, although all of the new growth was killed, there were many nearly dormant buds which were uninjured on April 19 and temperature conditions were not favorable for their development till after May 18 when growth conditions were very favorable. However, a lower percentage of these dormant buds contained flower primordia than did the buds developed earlier. On June 20, the number of immature bunches of grapes per vine at the highest, middle and lowest elevations were 20, 3 and 8, respectively."

Grass and Legumes Grown with Kudzu - E. C. Richardson of Auburn, Alabama.-"In late summer of 1943 an area of established kudzu was disked down and seeded to hairy vetch, crimson clover, bur clover, Caley peas and ryegrass. Seeding date was September 15, 1943. Good stands were obtained. Each specie grew to maturity and produced a satisfactory seed crop which shattered out on the land early in 1944.

"In the absence of grazing, the area was again disked in September 1944 to reduce the kudzu canopy and to open up the sod where the young seedlings could develop.

"Fair to good volunteer stands of all species seeded were obtained. Best stands were obtained from Caley peas and ryegrass. Stands of crimson clover and bur clover were thin due to heavy kudzu mulch and summer germination.

"These trials suggest the possibility of growing reseeding-winter annuals in kudzu stubble for late winter and early spring grazing. In such a system it would be necessary to carefully manage the grazing to avoid injury to the kudzu. These combinations should be tested under actual grazing conditions to establish the limits of grazing without injury to stands of both annuals and kudzu."

First Cutting of Little Bluestem Hay - J. B. Pope of Tyler, Texas.-

"An average of one ton per acre of hay was harvested from an eight-acre meadow which was cut June 20. A second cutting is expected the latter part of August. Little bluestem looks good as an upland meadow grass in East Texas. This meadow was seeded in 1939 and has given two cuttings of hay each season, averaging over two tons of hay per acre since 1942."

Pasture Studies - R. M. Smith of Morgantown, West Virginia.-

"Some interesting differences are evident among the several different seed mixtures being compared in pasture tillage trials. Two pounds of white clover (Louisiana) per acre is giving a much denser stand than one pound, and for some conditions, especially with close grazing, the higher rate of seeding of white clover may be more successful than additions of other legumes. Ladino white clover has been prominent in several seedings under continuous grazing but in at least one case it has apparently eliminated most of the associated Louisiana white clover so that the ground was left with a very poor legume stand when the Ladino clover was killed out the second year. There is also some indication that this may occur in recent seedings.

"Orchard grass is sometimes considered low in palatability but at this date all plots containing this grass seem to be more closely grazed than plots that are predominately white clover or other legume-grass combinations.

"Shallow, trashy plowing as a method of seedbed preparation both in the fall and the spring is giving excellent results. It appears that this type of tillage may be easier and more practical than the disk or spring tooth harrow in many cases, especially where the vegetative cover is dense and grazing will not be heavy during the first year."

Low Nitrate Production Under Residue Mulch - Edgar C. Joy of Brookings, South Dakota.-"We have had a cold wet spring with abnormally prolonged periods of low temperatures. Nitrate production has been slowed and the crops are much poorer on subsurfaced land or land where much straw residue was left. This is the first year we have experienced this difficulty to any great extent in South Dakota."



Influence of Subsoiling Lost - Joel E. Fletcher of Tucson, Arizona.-"Infiltration measurements in the San Francisco Peaks Soil Conservation District indicate that the influence of subsoiling in the fall of 1943 had been obliterated by some farmers by their practice of disc cultivation when the soil was too wet. The layer formed by this cultivation was, however, thinner than the original layer, even though it impeded water equally."

Too Much Rain - George W. Hood of Batesville, Arkansas.-"The rainfall for this month was 12.07 inches, which is approximately 3 times the normal, and for the first six months of this year totaled 47.69 inches. This was almost equal to the total yearly rainfall for the 40 year average. If we get the normal moisture for the balance of this year we will have about a total of 75 inches.

"Needless to say, farm operations were delayed and much grain was lost because the ground was so soft that machinery bogged down. It was also impossible to cultivate row crops and weeds are growing rapidly. Unless more seasonable weather prevails soon, the yield of both corn and cotton will be materially reduced."

Nitrate Differences in Wheat (Tissue Tests) - Carl L. Englehorn of Fargo, North Dakota.-"Cold, wet spring weather delayed seeding of the Langdon tillage plots until May 10. Subsequent cool weather resulted in slow germinations of wheat and a rather slow rate of growth. By June 30, the crop was four or five inches high. Wheat on the plowed plots was of a healthy green color, while that on plots tilled with other implements was of a pale green color, indicating a shortage of nitrate nitrogen. This was especially true of the stubble-mulch plots. Plant tissue tests as described by George N. Hoffer in "Hunger Signs in Crops" indicated a difference in nitrate as between wheat plants grown under different methods of seedbed preparation. According to this test, wheat from the subsurface-tilled plots showed only a trace of nitrates; field cultivator, a trace; burn, no tillage, trace; oneway disk, low; spring plow, medium; and fall plow, high. On summer fallow, wheat seedlings from plowed plots and from subsurface-tilled plots were very high and from plots tilled with the field cultivator, medium in nitrate nitrogen.

"These differences are doubtless due to variation in the amount of nitrate nitrogen in the soil as between tillage method. With a limited supply, assimilation of nitrates by plants has been as rapid as absorption, leaving no balance in the tissues whereas with a more plentiful supply in the soil, absorption has been more rapid than assimilation. The production of nitrate nitrogen in the soil may be influenced somewhat by soil temperatures. Plant residue cover seems to influence soil temperature somewhat as indicated by the following data showing soil temperatures in degrees centigrade as determined at one and at two inch depths at Edgely as of May 30. Atmospheric temperature at the time of determination was 29 degrees centigrade.

Tillage method	Soil temperature, degrees centigrade at -	
	One-inch depth	Two-inch depth
Moldboard plow.....	36.8	29.0
Disk.....	36.3	28.7
Field cultivator.....	35.3	27.8
Burn, no tillage.....	35.0	28.9
Subsurface tiller.....	33.8	27.8
Two-ton straw, sub- surface.....	31.6	25.7

Subsurface Tiller for Corn Land - C. A. Van Doren of Urbana, Illinois.-"On the mulch-farming plots preparation of seedbed with a Dempster subsurface tiller was unsatisfactory. The extremely wet spring prevented early tillage, hence the weed growth was not killed. The plots were double cut with a disc harrow to prepare a satisfactory seedbed. This practice covered a greater percentage of the crop residue than was deemed desirable. Corn was successfully planted on plots mulched with one ton of straw per acre except on one plot which was planted after a rain had started. On this plot the wet mulch tended to drag and to be released from the stub runners in bunches. A poor stand of corn was obtained on this one plot."

Mesquite Eradication Studies - C. J. Whitfield of Amarillo, Texas.-"Overall costs of spraying mesquite sprouts with a growth hormone are proving to be considerably less than that of other chemicals. Total cost, including cost of chemicals, labor, tractor operation, maintenance and depreciation and the sprayer operation, was \$2.54 per acre for the growth hormone, \$8.96 per acre for the chlorate plus calcium chloride, and \$10.90 per acre for the ammate. Rates used in figuring these costs were labor at 50 cents per hour, tractor at 30 cents per hour, sprayer at 10 cents per hour, growth hormone (2-4 dichlorophenoxy acetic acid) at \$2.00 per pound, the chlorate and ammate at 15 cents per pound, and calcium chloride at 3 cents per pound. The concentrations of chemicals used were growth hormone at 1500 ppm or at .52 pound per acre, chlorate at 2 pounds per gallon plus calcium chloride at 1 pound per gallon and the ammate at 2 pounds per gallon of water. The significant thing about these costs is the unusually low cost of spraying with the growth hormone as compared to the other three chemicals. Data on the relative effectiveness of these sprays can only be obtained by waiting until the summer of 1946 to determine the amount of kill. All sprays used knocked off the leaves within a few days after being applied."

DRAINAGE AND WATER CONTROL DIVISION

Hydrologic Studies - L. L. Harrold, North Appalachian Experimental Watershed, Coshocton, Ohio.-"Although total rainfall for the month (3.9 inches) was about normal, the amount falling at high intensities was less than normal and as a result, the amount of runoff and erosion was quite small. Of the 15 days of the month during which rain fell, the maximum daily total was less than 0.6 inch and on 3 days the total was between 0.5 and 0.6 inch.

"As shown in the following table, the greatest amount of runoff came from prevailing-practice-wheat watershed No. 106. Apparently the effects of erosion during the corn year (1944) and the fact that there was no manure top dressing applied last winter, combined to produce a very poor surface for either water or soil conservation.

Runoff and Erosion for June 1945

Culture*	Watershed:Total Runoff:Total erosion:			Average land slope
	No.** : for June	Inches	Lbs/acre	
Wheat (prevailing)	106	0.60	184	14
Wheat (improved)	121	.003	T	16
Wheat (improved)	188	.028	T	9
Corn (prevailing)	115	.136	165	7
Corn (improved)	123	T	T	6
Corn (improved)	109	.088	395	13
Corn (trash mulch)	128	.061	4	14
Strip cropped	111	T	T	8
(corn and meadow)				
-do-	124	T	T	13
-do-	187	.038	2	16

\*Prevailing practice is straight row farming, no manure top dressing on wheat, less fertilizer applied. Improved practice is contour farming, manure top dressing on wheat, high fertilizer application.

\*\*The drainage area of all watersheds is about 2 acres except that for No. 187 which is about 8 acres.

"Although the runoff from the corn land is small, the effect of conservation practices on comparable slopes is apparent. It is interesting to note that for the largest storm this month the erosion from watershed No. 109 as measured by the inclined axis-sampling wheel, totaled 633 pounds as compared with 513 pounds determined by sampling the large silt box. For the other runoff period this month, hand samples were taken every minute during runoff and the soil loss by this method, the silt box, and the sampling wheel, totaled 54, 25, and 55 pounds, respectively. It is possible that the sampling of the large silt box was not



adequate. Results from the sampling wheel to date are encouraging."

Hydrologic Studies - I. W. Bauer, Central Great Plains Experimental Watershed, Hastings, Nebraska.-"In June the precipitation at the meteorological station was 3.64 inches.

"The rain of June 5 was of fairly high intensities. The maximum 5-10 minute intensities were 6.98 and 5.58 in/hr. There was considerable runoff from the small watersheds. The average peak rates for two watersheds were as follows:

	<u>Contoured</u> Peak rate	<u>Str. Rows</u> Peak rate	<u>Subtitled</u> Peak rate
Corn	.98	2.98	1.05 Ave. 3 plots
Oats	2.62	3.36	2.38 Ave. 4 plots
Wheat	2.52	1.89	1.62

"The wheat is in good condition. There has been some damage from hessian fly, joint worm, rust and hail damage as high as 40 percent. The hail occurred on May 26. The hail stones were about the size of tennis balls and punctured a hole in the composition roof wherever they hit. Three miles north the crop damage was 100 percent."

Hydrologic Studies - R. B. Hickok, Lafayette, Indiana.-"Rainfall totaled 8.23 inches on the Throckmorton farm and 4.79 inches on the Dairy farm, compared with the June 'normal' of 4.09 inches for the locality. Precipitation was recorded for 19 days out of the month on the Throckmorton farm. Total accumulated rainfall for the calendar year was 4.62 inches and 0.70 inch above 'normal' accumulation on the Throckmorton and Dairy farms respectively.

"Runoff data have been compiled but not summarized. The following are comparative data for watersheds in corn:

Runoff from Corn Watersheds for June, 1945  
Purdue-Throckmorton Farm, Lafayette, Indiana

Watershed No.:	Treatment <sup>1/</sup> :	Total Runoff <sup>2/</sup> : Inches	% of Rain	Peak Rate of Runoff: Inches per hour
10	Prevailing	2.83	32.2	1.76
15	Prevailing	1.15	15.0	1.06
14	Conservation	0.93	12.2	0.39
18	Conservation	0.63	8.0	0.58

1/Corn, wheat, meadow rotation, 'square' tillage and seeding, common (light) fertilization on 'prevailing' practice watersheds, same rotation, contour seeding, heavy fertilization and manure plowed under for corn and top dressing on wheat watersheds; 1st year of 2nd rotation under differential treatment.

2/Based on total recorded by nearest raingage, taking into account appreciable variation in areal distribution of rainfall.

"Most of the runoff tabulated above occurred prior to the first cultivation of corn, reflecting a minimum effect of the contouring since storage created in planting operation with conventional shoe planter is much less than is ultimately developed by cultivation. However, it was noted that retention of water by the planter marks was significant.

"A large number of runoff samples were collected including composite samples from all rotation-crop watersheds for each runoff period and in addition several series of periodic samples collected manually for study of time distribution of concentrations and their relationships to rainfall and runoff intensities, etc. Analysis and summarization of data are not completed. However, the following data are available for the corn watersheds:"

Soil and Fertility Losses<sup>1</sup> from Corn Watersheds, June, 1945  
Purdue-Throckmorton Farm, Lafayette, Ind.

Watershed No.:	Treatment <sup>2/</sup>	Soil and Fertility Losses, Lbs./Acre		
		Total Solids	Organic Matter	Nitrogen
10	Prevailing	5,679	267.8	14.6
15	Prevailing	2,846	144.1	7.8
14	Conservation	968	52.3	3.5
18	Conservation	429	22.9	2.2

<sup>1</sup>/Additional data on losses of available K<sub>2</sub>O, P<sub>2</sub>O<sub>5</sub> and Carbonates, pending completion of analyses in progress.

<sup>2</sup>/See footnote No. 1, following preceding table.

Hydrologic Studies - John Lamb, Jr., Ithaca, New York.-

"While it rained on 19 days during the month, only one storm occurring on the 15th produced 2 periods of high intensity but of short duration, averaging 4 inches per hour for 8 minutes. The results of this storm are as follows:"

	Idle Land in Weeds	Woodland
Precipitation (Inches)	1.98	1.58
Runoff (Inches)	0.4585	0.2329
Runoff o/o Precipitation	23.2	14.7

Microbiological Studies - F. L. Duley, Lincoln, Nebraska.-

"Tests are being continued by T. M. McCalla to determine the possibility of losses of nitrogen and ammonia from crop residues. Nitrate determinations are also being made on land going to corn. Due to the cold, wet weather, the nitrate content has been very low this spring."

Runoff Studies - N. E. Minshall, Madison, Wisconsin. - "At Fennimore, Wisconsin, precipitation for June was 7.43 inches, nearly twice the normal amount for this month. There was rain on 11 days, but over 1/2 the monthly total was recorded on June 1 and June 28. The total precipitation for the first half of 1945 was 22.8 inches which is about 50 percent above normal for this period. During these periods of above normal rainfall, an intermittent spring develops above the station on the 171-acre drainage area. During the storm of June 28, there was a total rainfall of over 2 inches in 2 hours which caused the highest peak rates of runoff in the entire 7 years of record on all watersheds excepting 22.8-acre area. An average gage for this storm showed maximum amounts during various time intervals as follows: 5 minutes - .65 inch; 10 minutes - .87 inch; 15 minutes - .94 inch. There have been several storms with intensities higher than these during the 7 years of record, but the maximum rates during the June 28 storm came late in the storm period which has not been the case of most of the other heavy storms. Another factor causing higher rates of runoff this late in the season was the late date of planting corn (due to wet and cold weather) which was only 6 inches high June 30. Comparative data for the various watersheds is given in the following table:

Drainage Area	Rainfall	Runoff	Peak Rate of Runoff	Corn	CROP COVER (Percent of Area)			
					Sm. Grain	Hay	Pasture	Buildings & Roads
Acres	Inches	Inches	Inches per hour					
22.8	2.05	.61	2.68	15.5	46.2	38.3		
52.5	2.13	.39	1.63	25.7	23.7	15.5	27.8	7.3
171	1.96	.47	1.31	38.3	20.6	22.5	12.9	5.7
330	2.02	.50	1.01	32.6	21.9	21.7	18.3	5.5

"Precipitation for June at Edwardsville was 8.74 inches which is about twice normal. The total precipitation for the first half of 1945 was 29.6 inches or about 50 percent above normal. Rain occurred on a total of 17 days with over 2 inches on the 7th and again on the 16th. The runoff from the 50-acre pastured watershed totaled 4.37 inches or an amount equal to 1/2 the total rainfall. The storm of June 16, with a total rainfall of 2.67 inches, of which 2.13 inches fell in 2 hours, gave a total runoff of 2.19 inches for the pastured watershed. Peak rates of runoff for this storm were as follows: 27 acres - 1.53 inches per hour; 50 acres - 1.25 inches per hour, 290 acres - .88 inch per hour. The peak rates of runoff for this storm were not caused by the period of maximum intensity which occurred early in the storm, but rather by a much lower sustained uniform intensity later in the storm period.

"Mr. Prochaska of the Bridge Department, Wisconsin Highway Commission, was in the office on June 16 to check the preliminary design capacity



of a bridge in southwestern Wisconsin having a 3 square mile drainage area against the 50-year peak rate of runoff as estimated from our Fennimore records."

Runoff Studies - H. K. Rouse, Colorado Springs, Colorado.-

"Precipitation during June averaged 2.31 inches which is 56 percent above the 7-year average. The distribution was very spotty with the northern watershed (W-IV) receiving more than twice that received by the southern group of watersheds. On June 22, Watershed W-IV received precipitation which was excessive for all periods from 10 minutes to 1 hour. Runoff was unimportant with a peak rate of but 0.04 inch per hour. On June 24, this watershed received precipitation which was excessive for periods of 10 minutes to 25 minutes. Runoff was negligible in both peak rate and total amount.

"The first irrigation of the field test of four different methods of irrigation was made on June 16. All field installations were completed during the month and volume-weight determinations were made.

"Mr. Rouse was invited to make a talk concerning the runoff studies and other research activities at Colorado Springs before the summer meeting of Chiefs of the Regional Divisions and Zone Conservationists, at Albuquerque, New Mexico, on June 27."

Hydraulic Studies - F. W. Blaisdell, Minneapolis, Minnesota.-

"Mr. Donnelly continued his study on rectangular-spillway outlets. Tests were made to determine the relation between the length of basin  $L_B$ , the width at the end of the basin  $W_e$ , and the tailwater depth  $d_2$ . The tests were then plotted,  $d_2/d_{ce}$  against  $W_e/d_{ce}$  ( $d_{ce}$  is the critical depth at the end of the basin). The equation resulting from the curve is

$$d_2 = 1.60d_{ce}.$$

Where  $W_e/d_{ce}$  exceeds 11.5, the equation becomes

$$d_2 = d_{ce} + 0.52W_e.$$

These tests were made with wall flares of 2:1, 3:1, and 6:1 and with basin lengths varying from zero to 28 inches. A minimum basin length has not yet been determined. The tests to date have shown that any length of basin can be used provided the appropriate tailwater depth is also used. At the end of the month the height of the end sill was under investigation."

Hydraulic Studies - V. J. Palmer, Stillwater, Oklahoma.-

"A paper entitled 'A Method for Designing Vegetated Waterways' was approved by Dr. Nichols' office and submitted to the American Society of Agricultural Engineers for publication in 'Agricultural Engineering.' This paper presents a simple graphical method of channel design

where the retardance coefficient  $n$  varies with depth and velocity of flow. It is based on the use of VR (the product of velocity and mean depth) as a criterion for estimating  $n$ . Graphical solutions incorporating velocity, bed slope, hydraulic radius, and Manning's  $n$  are presented for long green Bermuda grass and lespedeza sericea. These serve a wide range of covers, the former being applicable to many sod-forming covers and the latter to many bunch grasses and tall stiff-stalk vegetations. To facilitate selection of channel cross-section graphical solutions of the elements of triangular, parabolic, and trapezoidal channels with 3 to 1 and 6 to 1 side slopes are included."

Hydraulic Studies - D. D. Smith, McCredie, Missouri.--"A paper entitled 'Flood Control Aspects of Farm Ponds' is being prepared for publication by A. W. Zingg.

"A survey relative to the existing drawdown on 268 farm ponds over the State was made in May. A study of these data showed that 12 ponds per square mile having the characteristics of those surveyed would be capable of extracting less than 1 percent of a 1-inch storm runoff. Of the total number of ponds, 75 percent were full to the spillway level, and 55 percent were discharging a small continuous trickle of water through their spillways. Forty percent of the spillways were in need of repair. Visible leaks through earth fills were observed on 30 percent of the ponds, and 25 percent of the ponds were not full to the spillway level. Over half of the storage space available to obstruct a storm runoff was contained in 10 ponds."

Hydraulic Studies - C. W. Lauritzen, Logan, Utah.--"Some improvement has been made in the device for recording the silt content on the eroding stream. Considerable time was spent assembling data and preparing a report dealing with the mechanics of erosion. Revision of the manuscript entitled 'Soil Erosion Experiments in Small Irrigation Furrows' was continued.

"Permeability measurements were continued. Model studies with bentonite linings were continued. Surveys, plans, and negotiations incident to the construction of a Hydraulic Laboratory were continued. Preliminary surveys and plans for some experimental sections in a small canal of the Nibley Blacksmith Fork Irrigation Company system were developed."

Hydraulic Studies - A. W. Marsh, Corvallis, Oregon.--"Weirs, control boxes, measuring flumes (HS type), and checks were installed on 30 plots, and their supply ditch. A concrete weir and dividing box was constructed at the upper end of the new pipe line and a concrete riser at the lower end to complete the construction necessary for supplying and controlling water to the plot site and adjacent fields. At the dividing box it was decided to install one fixed and two adjustable weirs to regulate the water between the three farms which obtain water at this point. All weirs feed from a common stilling pool rather than having three control gates and three separate stilling pools.

"One irrigation was completed during the month. A rainstorm of .93 inch in 25 minutes, most of which fell in 10 minutes, just a few days before the irrigation effectively neutralized any planned differences in sizes and shapes of the furrows. Some furrows were so silted in that difficulty was experienced in holding water in the proper furrow."

Hydraulic Studies - Vito A. Vanoni, California Institute of Technology, Pasadena, California. - "Tests were continued for the SCS office at Fort Worth, Texas, on the proposed spillway for Lake Carl Blackwell at Stillwater, Oklahoma. Experiments during the month concentrated on the design of a spillway with a capacity of 17,300 cfs, with a crest width of 200 feet, and a chute width of 100 feet. The problem was to design the contract so that the flow in the chute was uniformly distributed, and the flow in the contraction section was steady.

"The preliminary design for this structure, which was based on building the spillway on the earth-fill dam, called for a length of contraction of 66 feet. The tests showed that this distance was too short to effect a satisfactory contraction. Model tests of a basin 75 feet long did not result in a completely satisfactory design, and it appeared that if this type of structure is to be used, it will have to be lengthened further."

Sedimentation Studies - Carl B. Brown, Washington, D. C. - "At the request of Region 5, an investigation was made by Mr. Gottschalk of silting in stock-water reservoirs in the Land Utilization Project near Pierre, South Dakota. With the cooperation of an engineer and helper, detailed by the Region, surveys of 19 representative stock ponds were completed during June. Computations and analysis of data were begun.

"Considerable progress was made by Mr. Glymph in the investigation of sedimentation rates in the Central Valley area of California. Preliminary inspections were completed at about 10 reservoirs. A preliminary survey of Lake Gilmore, which has a gently rolling watershed of 4.89 square miles, almost entirely in native grass, indicated an annual storage loss of only 0.12 percent and an annual sediment production per acre of only 0.22 ton.

"A range survey of Paper Mill Pool at the upper end of Loch Raven Reservoir, owned by the city of Baltimore, was completed by a party consisting of an engineer from SCS Operations offices and assistants from the city of Baltimore. A survey plan was prepared by the Sedimentation Section. The purpose of the work is to lay a basis for periodic measurement of the effectiveness of the experimental vegetal plantings and the channel diversion being made by the city of Baltimore upon recommendations of the Soil Conservation Service, to control silting in this reservoir.



"Two days were spent in an inspection of the watersheds above the municipal reservoirs at Greensboro and High Point, North Carolina, and in the development of a conservation plan in cooperation with officials of Region 2 for the control of silting in this reservoir.

"A discussion was prepared on the important paper by J. C. Stevens entitled "Future of Lake Mead and Elephant Butte Reservoir" published in the May issue of Proceedings, American Society of Civil Engineers."

Sediment Studies - Vito A. Vanoni, Cooperative Laboratory, California Institute of Technology, Pasadena, California.-"The closing discussion of the paper by Vito A. Vanoni, entitled 'Transportation of Suspended Sediment by Water', which appeared in the June 1944 issue of the Proceedings of the American Society of Civil Engineers, was forwarded to the editor for publication. The only new data included with the discussion were represented by curves showing the effect of sediment concentration on channel friction, the universal constant,  $k$ , in logarithmic-velocity-distribution formula, and the exponent,  $z$ , in the suspended sediment distribution equation.

"Professor Francis D. Curtis, University of Michigan, requested that this office suggest a statement regarding the relationships between sediment load and stream velocity and stage, which would be appropriate for a textbook on biology. Professor Curtis also quoted the 6th Power Law and asked if this law would be suitable. The statement prepared by this office, therefore, included a brief discussion of the 6th Power Law. The main point to keep in mind with regard to the 6th Power Law is that it gives a relationship between the diameter of the largest particle that can be moved and the velocity at the stream bed. The law is often stated, 'The moving power of a current varies as the 6th Power of the velocity'. Very often the 'moving power' is taken to be the maximum load that the stream can carry and the velocity is taken as the average velocity for the stream. This leads to an erroneous interpretation and result. The relationship between the average stream velocity and the sediment load cannot be expressed by such a simple formula. In order to get approximate formulas of the Power Law type, the bed-load relationships developed by H. A. Einstein were plotted so that the rate of transportation became a function of the average stream velocity. From these graphs, it was determined that for very low rates of transportation, the amount of material transported varies about as the 12th or 15th Power of the average velocity. At moderately high rates, the amount of material transported varies approximately as the cube of the average velocity. These Power Laws are not suggested as means for calculating bed-load transportation. They are valuable in visualizing the relationships between transportation and stream velocity. For actual calculations, the original Einstein formulas should be used.

"A study was made of the sediment deposits in Lake Mead, particularly as to location, kind, and specific weight, for the purpose of discussing the paper by J. C. Stevens on the 'Future of Lake Mead and Elephant Butte Reservoirs' which is current in the Proceedings of the American Society of Civil Engineers. In the course of this study, graphs showing sediment concentration in lower Lake Mead were brought up to date. An attempt was made, by using Soil Conservation Service contour maps and Bureau of Reclamation data, to estimate the volume of the delta deposits at Lake Mead."

Drainage Studies - R. E. Morris, North Liberty, Indiana.-

"The table shown below gives the average level of the plot water tables during the month of June:

Plot No.	Desired distance of water table below ground surface	Distance below ground surface at which water table was actu- ally maintained
	<u>Inches</u>	<u>Inches</u>
1	45	34
8	45	40
3	30	29
6	30	29
2	24	24
7	24	22
4	15	16
5	15	16

"From the table it can be seen that with the exception of the 45-inch plots it was possible to maintain the water tables reasonably near the levels desired. Given normal rainfall during July it should be possible to drain the 45-inch plots to approximately the required elevation.

"A total of 4.9 inches of rain fell during June. Of this amount, 2.4 inches fell on June 28 within a period of 3 hours.

"Shoring of the ditch banks was started and 200 feet of this work was completed."

Drainage Studies - I. L. Saveson, Baton Rouge, Louisiana.-

"In connection with the mole drainage tests being conducted in North Dakota, I arrived in Fargo, North Dakota the morning of May 30. Mr. Severson, the work unit leader, and I looked over several areas as to adaptability of moling. Moisture conditions for moling were ideal that day. The problem areas in general are pot holes, or at

least those are the ones about which they are most concerned. It can be generally stated that the entire area is wet. The staff estimates that approximately 15 percent of the land was not planted this season.

"In the Fargo area we moled out 8 small areas on 2 farms near Wild Rice. The Harold Anderson farm, 1 mile south and 1 mile east of Wild Rice, and the Chester Brakke farm, 1 mile east of Wild Rice. The moled areas with the exception of one were pot-hole areas. This seems to be the big problem in this area or rather the one with which they are most concerned. A flat area of approximately 10 acres was moled out on the Brakke farm. In all the areas moled in the Fargo district area natural outlets were used. A couple of them were pretty steep and may erode some. The moles began running water the next day after installation. The owner was quite enthusiastic, calling in the neighbors to see it. The areas we worked were very wet. We got stuck 3 times in one day with a 75 h.p. Caterpillar tractor.

"At Wapeton, North Dakota, we moled out two areas, one was quite sandy and may not stand up, but other areas were too wet. It rained 8 of the 18 days I was in North Dakota. The ground was very wet, so we were not able to mole as many areas as we would have liked to mole.

"Mr. Francis, the Regional Engineer, was unable to come to North Dakota and asked that I come to Lincoln to discuss the North Dakota problems, and the following is a summary of this discussion:

- (1) North Dakota has an acute drainage problem having limited the crops for the past three years and this year they are not very promising.
- (2) Outlet ditch construction is under way and farm drainage is the next order of business.
- (3) Since the area contains a lot of pot-hole areas it will require a mole machine which can install moles on grade. (The English machine which we shipped to North Dakota follows the contour of the land thus you have to rely on the head created to make water flow in the moles.)
- (4) The area in question is high potential agricultural land.
- (5) Stubble in wheat fields clogs up the mole machine and the machine should be equipped with a rolling coulter.
- (6) Pot holes standing full of water do not lend to moling. You cannot get the tractor through and when you back the mole machine into the area, pulling toward the outlet, they do not run long until the slush closes them.

"That since there is so much at stake from an agricultural standpoint, it was recommended that we go back into this area this fall with the Killifer machine for the following reasons:

- (a) Crops will be out of the way and a complete mole system can be installed.



- (b) It is hoped the area will be dry enough for tractors to operate.
- (c) Pot hole should be dry enough to mole.
- (d) Kilifer machine will cut a grade and a more satisfactory job of moling can be done in pot hole areas.
- (e) Oultet construction will have advanced farther in the Fargo area, thus we will be able to select a better sight and a complete mole system installed.
- (f) Hoping that weather would be more settled and demonstrations could be scheduled for public inspection.

Drainage Studies - C. Kay Davis, The Everglades Project, Fort Lauderdale, Florida. - We completed the collection of topographical data in the area north of the Hillsboro Canal, with the exception of a 3-mile gap on the north line of Township 46 S. We completed the east and west line on the north line of Township 45. This with the north and south line which extends from the Hillsboro to the Palm Beach Canal, about 3 miles east of the 40/41 Range Line, gives us a fair conception of the topography in this area.

"The collection of field data on the stub canals in Dade County is progressing satisfactorily. We have completed the base line and the cross section of Snake Creek, Biscayne, Little River, and Tamiami Canals. The field party has completed the base line on the Coral Gables Canal and is now making cross sections of this Canal. We are obtaining the cross sections of the Miami Canal from the War Department and will use this data in the development of controls for the Miami River Basin. The field party will next collect data on the Snapper Creek Canal, Goulds Canal, Military Canal, Mowry Canal, North Canal, and the Florida City Canal. While there are several other canals that should be considered of sufficient importance for the establishment of control works, our cooperation with Dade County may end with the Florida City Canal.

"The water table has been below the top of the rock on most of our aerial gages. We should get some worth while information, however, from these gages on our July readings. I found an area that resembles a volcano when looked down upon from an airplane. This area is four miles west of North New River Canal and four miles north of the Palm Beach-Broward County Line. The area is about a half mile long and three quarters of a mile wide, and burned to a depth of about 16 to 18 inches. This area will now become a big alligator hole."

## IRRIGATION DIVISION

Evaporation, Transpiration and Seepage Losses Affecting Irrigation Practices - Method of Estimating Water Requirements.-A report for the Office of Operations entitled "A Method of Estimating Water Requirements in Irrigated Areas from Climatological Data" was completed by Harry F. Blaney and Wayne D. Griddle. The report describes the procedure for computing consumptive use of water and irrigation requirements for alfalfa, cotton, and other crops, based on mean monthly temperatures, percent of daytime hours, length of growing season, average monthly precipitation, and other data. Estimates of seasonal consumptive use by alfalfa for some 40 areas in 13 Western States are given in the report, which is being mimeographed in a limited edition.

Irrigation Requirement Report.-A. A. Young reports completion of the California report, which is a compilation of available data on irrigation of crops, including climatic factors of temperature and rainfall; soil moisture data on transpiration use and consumptive use; depths of water actually applied in irrigation of crops; and estimated irrigation requirements of crops in all the principal irrigated districts of the State. It is intended as an aid to farmers in proper irrigation, including monthly distribution of water and total amounts required seasonally by the crops. Irrigation requirements differ in different parts of the State according to type of crop grown, climatic zone, altitude and latitude. The report should be of material assistance to technicians assisting farmers in irrigation on soil conservation districts.

Antelope Valley, California.-A report on "Preliminary Estimate of Consumptive Use and Irrigation Requirements for Alfalfa, Antelope Valley, California" was completed by Harry F. Blaney for the Soil Conservation Service staff to be used in connection with irrigation studies being conducted in Antelope Valley Soil Conservation District. The report shows the estimated monthly consumptive use of water and the probable monthly demands for irrigation water for the period April 1 to November 30. The results indicate that under normal conditions 52 inches will be required for a 7-month irrigation season and 56 inches will be required for an 8-month period. Under present irrigation practice in the Valley, 60 to 72 inches of irrigation water is applied during the season. A more efficient use of irrigation water might be obtained by proper land preparation and shortening the length of borders.

Preliminary manuscript entitled "The Irrigation Water Supply of Antelope Valley," incorporating the significant portions of reports made to date by members of the staff of the Division of Irrigation, was completed by Paul A. Ewing and submitted for review to personnel likely to be involved in future developments. The manuscript includes the Blaney memorandum on Consumptive Use, the assemblage of data on duty of water, prepared by A. A. Young, and much descriptive and statistical data submitted by Dean C. Muckel to the Emergency Rubber



Project. Also included are statistical data, heretofore unpublished, obtained by Mr. Ewing from the Bureau of the Census as a test of the possibility of developing significant information from Census records where natural boundaries of areas conform closely to the minor civil divisions represented in Census enumerations, many of them not carried into standard tabulations.

Canal Lining Experiment.--Carl Rohwer reports observations on the experimental canal lining on the College Farm at Fort Collins, Colorado, which is being laid under the direction of the Soil Conservation Service engineers in the district. A special hoe, which rotates around on axle placed along the axis of the lateral was designed and built by Mr. Rohwer. By swinging the hoe back and forth and at the same time sliding it along the axle, the operator can trim the excavation accurately to shape and grade. A trowel, operating on the same principle, was built to form and smooth the circular portion of the concrete lining. Both devices are in use on the work and seem to be giving satisfactory service.

Formulation of Irrigation Water Balance Sheets - Classification of Land for Irrigation and of Farm Irrigation Water Supplies.--J. S. James reports: "The problem of classification of land for irrigation and of farm irrigation water supplies has been given particular consideration. A simplified classification of these basic factors seems essential in analysis of any irrigation area and in planning the use of land and water for the area, or for individual farms. The Bureau of Reclamation has developed standards for such a land classification. The Farm Security Administration has carried out that classification in greater detail and with some refinements. However, it is not apparent that adequate consideration has been given to the physical properties of soils in relation to moisture - what might be called the hydrological properties of the soils. Data developed on the relationships between soil and water and on the water requirements of crops do not appear to be available in form for ready reference and for general understanding by farmers and farm planners. Some work has been done with the limited data available in this office to develop useful, concise interpretation and presentation of such information.

"Further study was made of the classification used by the Federal Land Bank of Spokane in its appraisal work. This includes four classes representing relative adequacy of service. Each class is subdivided into good, average, and poor, within the main class. Furthermore, definite sub-classification is expressed in percentages of the value of a Class I (a) supply. This classification gives a direct interpretation of relative values. In this it is fully valid only within a certain area or set of conditions. In this way it is comparable to a land classification such as that used by the Bureau of Reclamation. Such a direct, simplified classification of both land and water supplies seems essential to intelligent planning of the use of these resources on either an area or a farm basis.



"As a background for irrigation, within a certain area, there is the comprehensive Land Use Capability Classification which has, virtually, universal application and can be interpreted in terms of definite relative land classes within the governing conditions of a limited area. It seems desirable to establish criteria and standards for a water-supply use capability classification of universal applicability which can be similarly interpreted in terms of relative classes in a specific area or set of conditions."

#### Snow Surveys and Irrigation Water-Supply Forecasts.-

R. L. Parshall reports that while it is too early to know definitely the accuracy of the recent forecast of the 1945 irrigation water supply in the Rocky Mountain section, it is known that those concerning the maximum fill of the four principal reservoirs on the North Platte - Seminoe, Pathfinder, Alcova and Guernsey - will be quite close. This aggregate figure was estimated as 1,200,000 acre-feet, and it now appears that the actual amount will be about 1,240,000. Our 1944 forecast for these four reservoirs was 1,000,000 acre-feet, the actual being 986,000.

Antelope Valley, California.-Dean C. Muckel reports and inspection with Stuart N. Twiss, Geologist, Operations Division, of certain areas in Antelope Valley, California, where it has been suggested that water from the Los Angeles aqueduct could be spread. Two of these places were questionable owing to the apparent shallow depth of alluvium. It is possible that one or two test holes will be put down to determine the spreading possibilities. The Soil Conservation Service portable well-drilling outfit is operating in the valley and it is believed it could be used for the test holes. Soil samples taken on the Kings Canyon debris cone showed no strata within the top 100 feet which would prevent or retard the downward movement of water spread on the surface. The Division of Irrigation recommended spreading here some years ago.. A plan of measuring a few wells on or near the cone, so that the ground-water level reaction to spreading of winter flow from Kings Canyon could be noted, was discussed with Mr. Twiss.

Design, Invention and Testing of Apparatus.-R. L. Parshall reports an agreement with Excelsior Ditch Company, near Pueblo, to install a number of 9-inch Parshall flumes in the Company's distributaries. A portable form is used for casting these structures monolithically. It was decided that for the Excelsior job a new and improved portable form should be made, incorporating new ideas. This form has now been completed and is ready for use. However, a measuring flume will first be cast on the College Farm in order to determine definitely whether or not present ideas of design are correct. The new design provides a curved transition section at the front of the structure. Mr. Parshall has improved the means of holding the short piece of angle iron at the upstream end of the converging section on the floor at the crest and at the downstream end of the throat floor, also the method of connecting the forms together by means of slotted

pieces of 1/4 x 1-inch strap iron. A number of photographs will show the details of the construction and general layout. It is hoped especially to improve on the method of measuring the  $H_a$ ,  $H_b$  heads, which heretofore has often been done by use of a measuring stick which indicates directly the rate of flow and also the effective heads well within the limit, .005 foot.

Riffle deflectors for sand trap.-Mr. Parshall reports conference with Soil Conservation Service engineers at Colorado Springs relative to the placing of riffle deflectors in the Fountain Mutual sand trap. This sand trap was originally designed and built as a vortex-tube device but it was discovered that the tubes were placed too low in elevation to operate efficiently, therefore necessitating some other means of trapping the sand out of this ditch. Two sets of deflectors were placed in this concrete structure and after a few hours of observation it appeared that they would be more capable of handling the bedload than the two vortex tubes.

Soil Moisture Studies.-Mr. Aronovici reports: "The recording well on the Dorman plot was installed and put into operation. A five-day record clearly shows a daily fluctuation of as much as 0.08 foot with the water table falling during the day, reaching a minimum at 6:00 p.m. and rising during the night, reaching a maximum at 7:00 a.m. Observations continued on daily water-table fluctuations. It is worthy of note that a very marked reduction occurs in the amplitude of the daily oscillation of the water table directly following the cutting of the alfalfa. Following the cutting, very little further drop in the water table was observed. This significant observation will bear directly upon the evaluation of the quantity of water withdrawn by the plants from the water table."

Leaching of Soluble Salts.-Mr. Aronovici reports: "As a result of discussion regarding the required amount of water for leaching the soluble salts from the soil, a preliminary study was set up. A 3-gallon cylindrical masonry crock with an outlet at the base was packed with a soil containing a high percentage of salts. Tap water of known salt concentration was then applied to the surface of the soil. The leachate was then collected at the outlet in 250 cc. units. These samples were then analyzed for chlorides by titration and total soluble salts by the gravimetric method. Observations were continued until the leachate reached a comparatively low salt level. It is obvious from data developed that leaching is a matter of diminishing return and may warrant further investigation from the standpoint of drainage."

Customs, Regulations and Laws Affecting Farm Irrigation and Drainage - Central Valley Project, California.-Paul A. Ewing reports that final action was taken by the coordinating subcommittee of the committee on Problem 8 and 9, Central Valley Project Studies. These committees had the task of allocating project costs, as between irrigation, power, flood control, navigation, salinity repulsion, municipal

and industrial uses, recreation and national security. Since each of these uses had been studied intensively by a separate subcommittee, the coordinating committee undertook to fit the several subcommittee reports into a set of recommendations for submittal to the two major committees. The final session of the coordinating committee was held June 29, at which Mr. Ewing represented the irrigation subcommittee. The report of the coordinating committee is a voluminous document in which is assembled a great mass of data pertinent to the plans of the Central Valley Project. It is expected that it will be published, perhaps as a Congressional document, since much of the data will be used by committees of Congress having to pass on the plans for the full development of the project.

Of main significance in the report of the Irrigation Subcommittee is the set of maximum unit values for irrigation water. These are shown below:

<u>Area</u>	<u>Delivery Point</u>	<u>Farm Value</u> Per ac. ft.	<u>Delivery point value</u> Per ac. ft.
Sacramento Valley	Sacramento River	\$4.23	\$3.08
Contra Costa County	Farm	4.50	4.50
Lower San Joaquin Valley	Delta-Mendota Canal	8.88	5.56
Upper San Joaquin Valley	Madera and Friant-Kern Canals		
	(a) Project Water	7.30	3.06
	(b) Decreased pump lift	1.70	1.70